(1) Overview

Insects and disease play an integral role in properly functioning forested ecosystems. However, unnatural populations, or outbreaks, can adversely affect these ecosystems. Usually disturbances from fire, blow down, and timber harvest gain greater notoriety than insects and disease outbreaks even though the extent of impacts from insects and disease is often much greater. Land area affected by insects and disease in the Canadian boreal forest during the 1990's was five times that area affected by fire and timber harvest (See figure 1). Insects and diseases that currently pose the greatest threat to forested lands on the SNF include Gypsy Moth, Spruce Budworm, and forest tent caterpillar. These insects, in particular, have the potential for repeated and prolonged damage for forest vegetation over several years. Each year, the State of Minnesota (DNR and MDA) and Forest Service (State/Private Forestry) cooperatively survey for forest insects and disease conditions. The 2005 areas of risk are shown in figure 2.

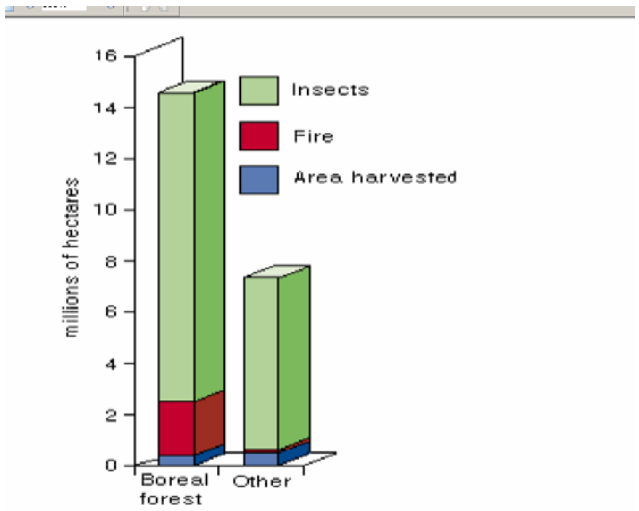

Figure 1.The land area affected by different disturbance types in the Canadian boreal forest in the 1990's relative to all Other forest types combined. Data are from the Canadian Forest Service.

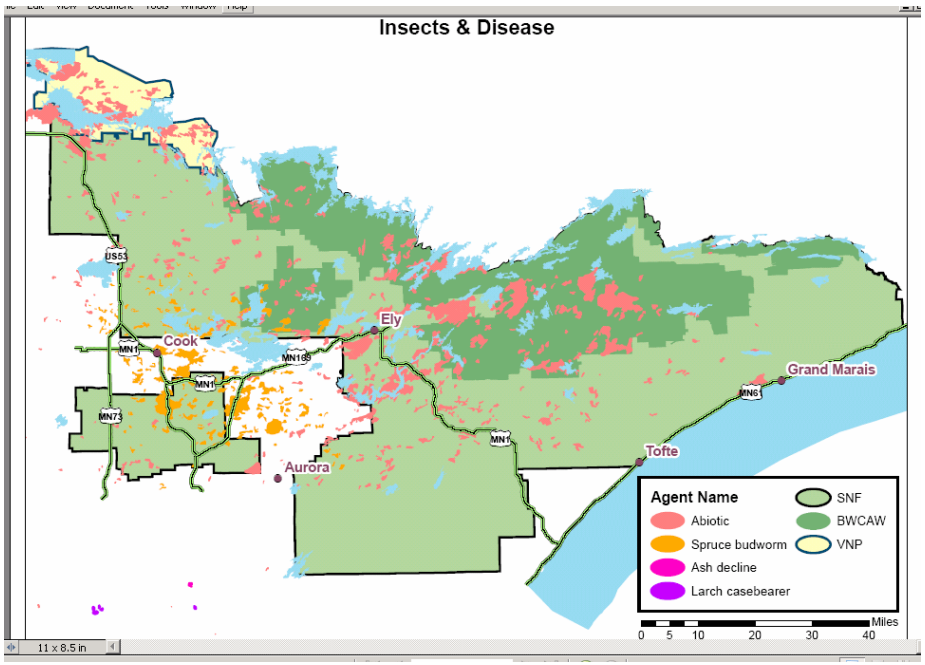

Figure 2. Insect and Disease Infestations 2005.

Gypsy Moth

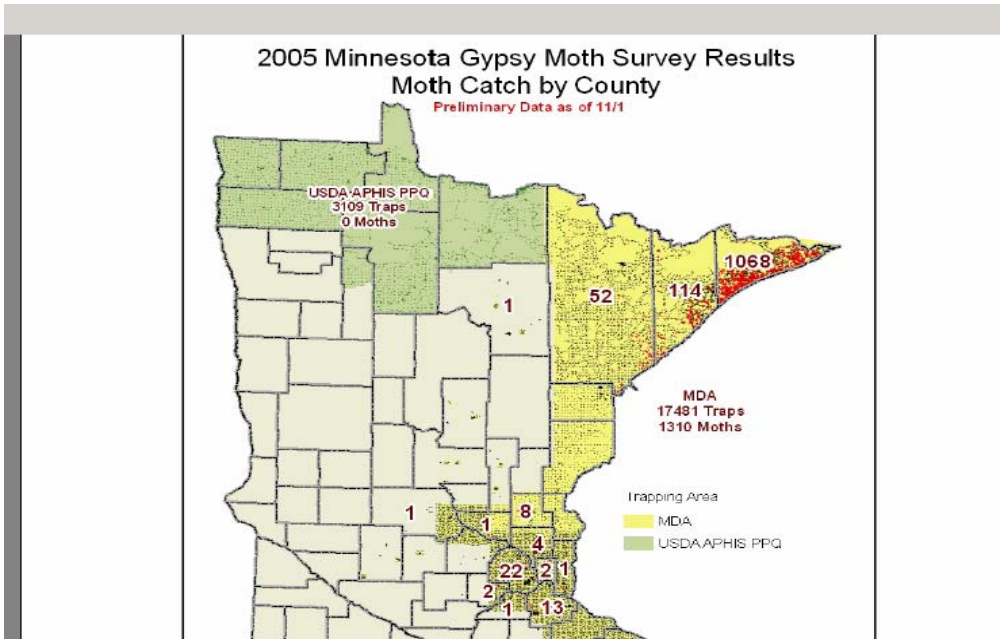

Figure 3. 2005 Gypsy Moth Survey Results.

A localized population of reproducing gypsy moth was discovered on the Superior NF approximately 9 miles northeast of Tower, MN in 2004. This was the first successful reproducing population discovered in northern Minnesota. In 2005, the population was successfully eradicated through the use of a bacterial insecticide (*Bacillus thuringiensis var kurstatki* or Btk).Significant numbers of male gypsy moths were trapped along the North Shore of Lake Superior (Cook County) in 2005. While not yet determined to be a reproducing population, this unexpected concentration of the gypsy moth has initiated planning for proposed treatment in the summer of 2006. Figure 3 displays Gypsy Moth survey results for Minnesota during 2005. Note high numbers of moths trapped in NE Minnesota

Spruce Budworm

During 2005 US Forest Service scientists from North Central Research station initiated a study to examine effects of tree-killing eastern spruce budworm (SBW) on balsam fir (*Abies balsamea*) and spruce (*Picea glauca* and *Picea mariana*) within a 4 1/2 million acre mixed forest ecoregion along the U.S.–Canadian border of Minnesota (MN) and Ontario(ON) (Fig. 4), defined as the "Border Lakes Landscape" (BLL) by the Nature Conservancy. A rich history of forest disturbance ecology conducted within the BWCAW in combination with pre-settlement vegetation data provides an opportunity to test the effects of different land management practices or protections on occurrence and extent of fir and spruce forests and their subsequent effects on SBW populations and outbreak impacts.

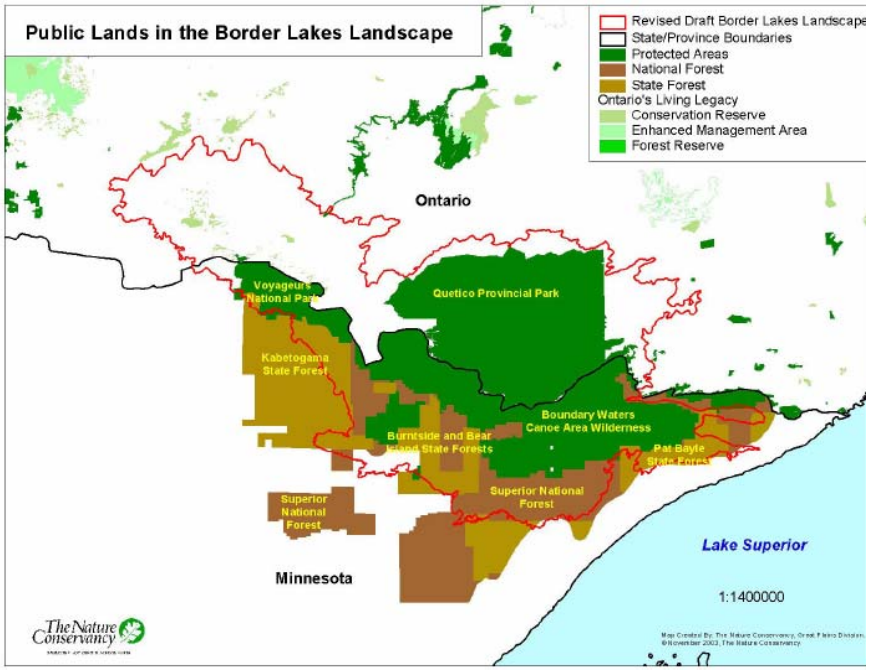

Fig. 4. Management regimes in the Border Lakes landscape: U.S. National and Minnesota State Forests (brown and gold) are actively harvested at fine-scales; Canadian crown lands (white areas of Ontario) are actively harvested at coarse scales; intervening wilderness (green areas in both nations) is not actively managed.

Within Minnesota defoliation increased to 92,500 acres, approximately a 10,000 acre increase from last year. Budworm activity continues to be centered in northern St Louis County with minor acreage of defoliation also occurring in southeastern Koochiching County and northeastern Itasca County. A number of white spruce plantations were defoliated in widely scattered locations in other parts of the state. Spruce budworm activity in northeastern Minnesota has been well documented since 1954 and is displayed in Figure 5. While an annual average of 220,000 acres of defoliation has been mapped during this period, activity during the most recent 5 years has been noticeably reduced. Figure 6 indicates the most recent spruce budworm activity occurring in the vicinities of the Laurentian and LaCroix Ranger Districts.

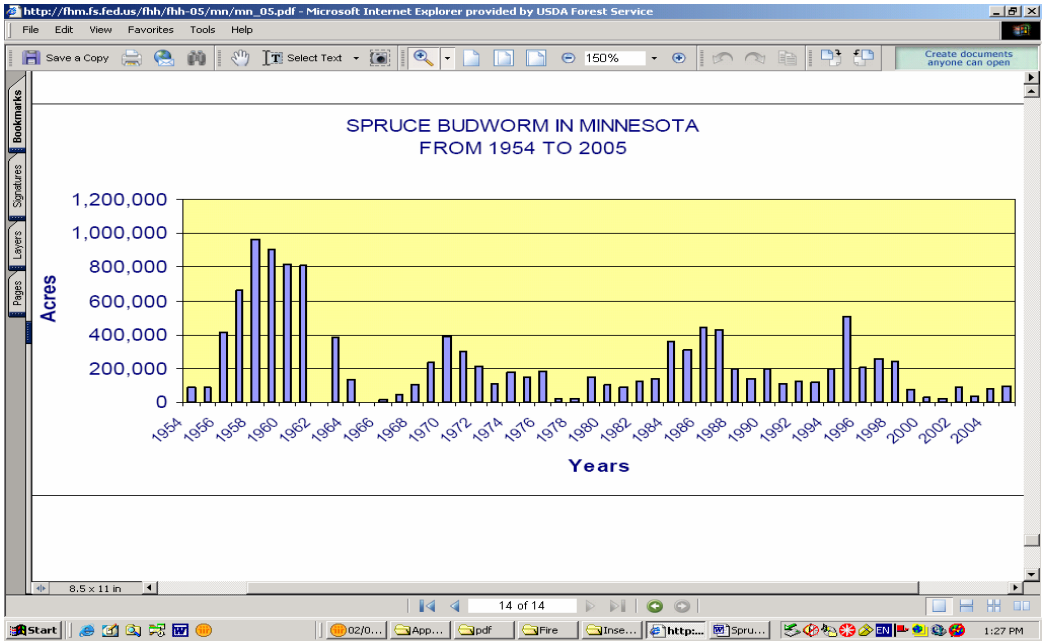

Figure 5. Spruce Budworm in Minnesota.

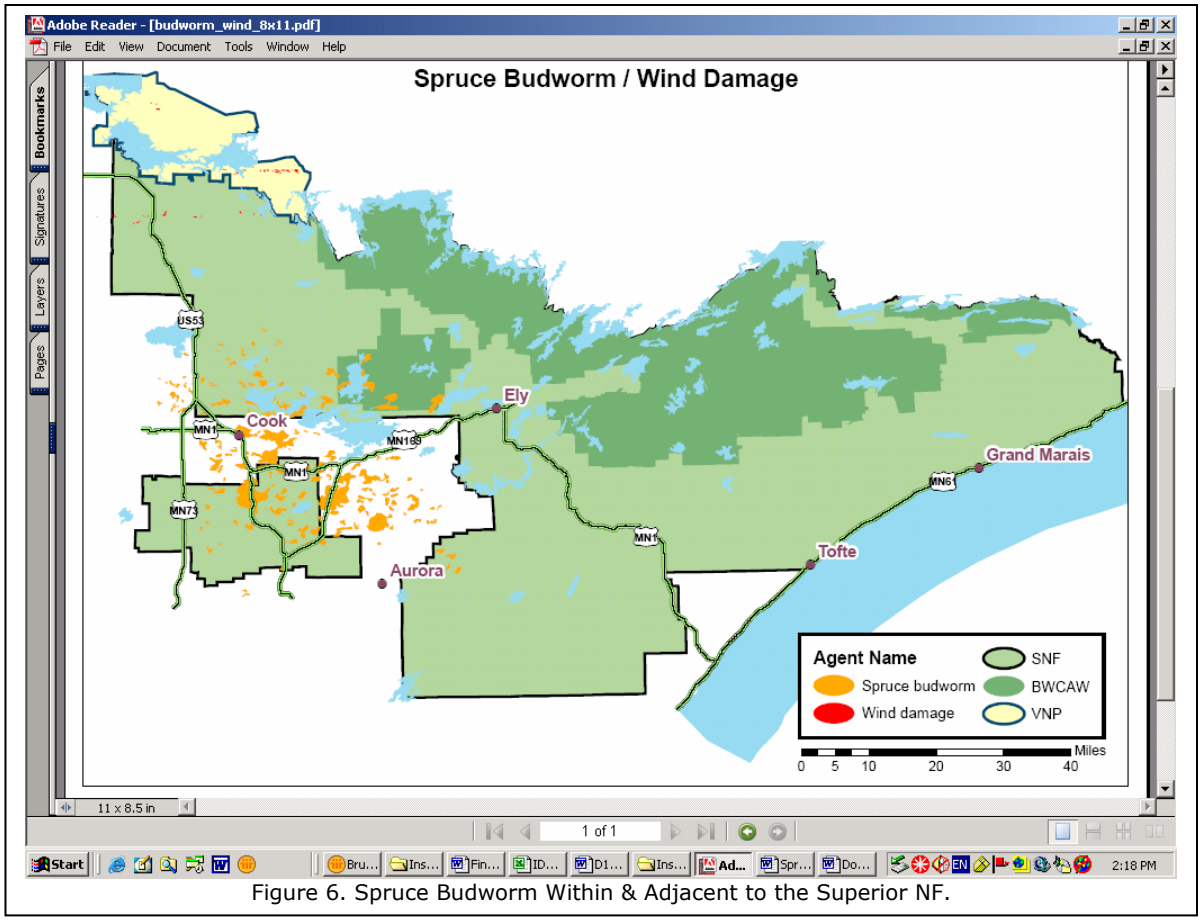

Figure 6. Spruce Budworm Within & Adjacent to the Superior NF.

(2) Monitoring Activities

Monitoring Question

To what extent is Forest management minimizing undesirable occurrences of fire, insect and disease outbreaks?

Monitoring Driver(s): 36 CFR 219.12 (k)(5)(iv). Destructive insects and disease organisms do not increase to potentially damaging levels following management activities

Applicable Monitoring Activity, Practice, Or Effect Measured	Methods	When Monitored	Location or Project Area
Acres Susceptible to Spruce Budworm; based on MN Dept of Agriculture trapping program, track acres infested with gypsy moth and treat appropriately.	Record the number of outbreaks (and acres affected) for each insect or disease organism (quantitative). Unless "damaging levels" has been concretely defined, a qualitative assessment of suppression will be made. State & Private Forestry completes an aerial survey of both National Forest and State lands on an annual basis. Hotspots are mapped while in the air and later followed up with ground-truthing and identification of the organisms causing the damage. They also summarize these efforts in an annual report that can be used as a source for our monitoring report. Trapping level by MDA for gypsy moth will be more intensive starting in 2005.	Results usually available from S&PF or MDA in October or November each year.	Gypsy moth (2005) – Treatment (eradication) in Tower Cooperative Gypsy Moth Project Area; Analysis initiated for potential treatment (mating disruption) along North Shore (Cook County). Aerial surveys completed.

Monitoring Driver(s): O-ID-1. Increase the amount of forest restored to or maintained in a healthy condition to reduce risk and damage from fires, insects and diseases.

Applicable Monitoring Activity, Practice, Or Effect Measured	Methods	When Monitored	Location or Project Area
Prescribed Fire Acres for Ecosystem Disturbance	Monitor acres treated to restore ecosystem health.	October	Forest Wide

(3) Evaluation and Conclusions.

Desired Conditions/Objectives

Monitoring Driver(s): 36 CFR 219.12 (k)(5)(iv). Destructive insects and disease organisms do not increase to potentially damaging levels following management activities.

2005 Accomplishment

Spruce Budworm infestation on the Forest was relatively localized occurring mostly in the vicinity of the LaCroix and Laurentian Ranger Districts. Activities were restricted to primarily monitoring. *Gypsy Moth* infestation was identified in 2004 near Tower with active suppression (eradication) occurring in 2005. Preliminary monitoring indicates treatment was successful. Monitoring of Gypsy moth on National Forest lands, in 2005, continued in cooperation with Minnesota Department of Agriculture.

2005 Accomplishment Contribution Towards Desired Conditions & Objectives

A. FOREST PLAN DIRECTION/FEIS CONDITION				
Record of Decision (7/04)	***(DECADE 1)***		***2005 Accomplishments and/or Condition***	
Existing Condition	FP DC, Objective, or S&G's	FEIS Projected or Proposed Condition	Actual Accomplishments implemented	Actual Accomplishments & Approved NEPA Decisions
Spruce Budworm Infestation – approximately 83,000 acres		Spruce Budworm population maintained at endemic levels	No acres treated.	No accomplishments/NEPA decisions
Gypsy Moth infestation - approximately 640 acres		Gypsy moth infestation at low, non-reproducing level. D-ID-2	640 acres treated;	640 acres treated; Tower Cooperative GM Project EA. 72,600 proposed on North Shore. Total= 73,240

B. ACHIEVEMENT OF FOREST PLAN DIRECTION/FEIS CONDITION			
% Achievement of Decade 1 Direction/Condition		***Trend***	
Actual accomplishments implemented	Actual Accomplishments & Approved NEPA Decisions	Actual accomplishments implemented	Actual Accomplishments & Approved NEPA Decisions
Gypsy Moth 100%	Gypsy Moth 100%	Attempting to Keep Situation Manageable.	Attempting to Keep Situation Manageable.

Monitoring Driver(s): O-ID-1. Increase the amount of forest restored to or maintained in a healthy condition to reduce risk and damage from fires, insects and diseases.

2005 Accomplishment

Spruce Budworm infestation on the Forest was relatively localized occurring mostly in the vicinity of the LaCroix and Laurentian Ranger Districts. Activities were restricted to primarily monitoring. *Gypsy moth* treatments included the eradication efforts in the Tower area and analysis initiated to address the developing situation along the North Shore. *Both* – Vegetative treatment analyses initiated in 2005 included consideration of proactive treatments to lessen future impacts from these insects. Potential treatments include those that manage forest composition to favor non-preferred food (forest) species; also, reducing tree densities to maintain healthy/vigorous growing conditions.

2005 Achievement of Desired Conditions & Objectives

FOREST PLAN DIRECTION/FEIS CONDITION				
Record of Decision (7/04)	***(DECADE 1)***		***2005 Accomplishments and/or Condition***	
Existing Condition	FP Desired Condition, Objective, or S&G's	FEIS Projected or Proposed Condition	Actual Accomplishments implemented	Actual Accomplishments & Approved NEPA Decisions
Acres Susceptible to Spruce Budworm; 222,000 Acres Susceptible to Gypsy Moth; 387,000		Acres Susceptible to Spruce Budworm; 271,000 Acres Susceptible to Gypsy Moth; 387,000	None Planted 1,235,000 conifer seedlings; improved vigor/composition 4250 ac	None ~

FOREST PLAN DIRECTION/FEIS CONDITION ACHIEVMENT			
% Achievement of Decade 1 Direction/Condition		***Trend***	
Actual accomplishments implemented	Actual Accomplishments & Approved NEPA Decisions	Actual accomplishments implemented	Actual Accomplishments & Approved NEPA Decisions
TBD	TBD	TBD	TBD

Standards and Guides

Standard & Guide Descriptor	Standard & Guide Description	Compliance	Remarks
D-ID-3	Insects and diseases are present and fulfilling their ecosystem function. Epidemics, when they occur, do not last longer than would be expected in a healthy ecosystem.	Initiated	Activities limited to improving species composition (increasing conifer component) and improving forest health/vigor by reducing tree densities and other conditions that favor insect/disease outbreaks.

(4) Necessary Follow-up and Management Recommendations

Monitoring Driver	Follow-up Actions
36 CFR 219.12(k)(5)(iv).	-Proposed 2006 "Slow-the-Spread" project in Cook County (pheromones) – Implement as proposed to include post treatment surveys to monitor effectiveness. -Gypsy moth trapping program – continue to coordinate with Minnesota Dept of Agriculture in their annual, state-wide program to monitor gypsy moth population trends. -Annual aerial insect/disease surveys (conducted by USFS State/Private Forestry) – continue to use this tool in determining insect/disease infestation levels and trends.
36 CFR 219.12 (k)(5)(iv).	-Provide recurring training, as needed, to field personnel in the ecological roles of insect/disease as well as tools in recognizing potentially unnatural populations/outbreak conditions. Note: The Superior has a 2-day training for FS personnel scheduled in June, 2006. -Include insect/disease concepts in all environmental education efforts.
O-ID-1	Actively incorporate insect/disease concepts into all vegetative management prescriptions.
O-ID-1	Implement Forest Plan direction that provides for healthy, sustainable forest conditions which limits the potential for damage from fires, insects and diseases.

(5) Collaborative Opportunities To Improve Efficiency And Quality Of Program

Collaborator/Partner	Monitoring Activity	Accomplishment
USDA Forest Service Northern Area State/Private Forestry	Monitoring/suppression	
USDA ANIMAL AND Plant Health Inspection Services	"	
Minnesota Department of Agriculture	"	
Minnesota Gypsy Moth Program Advisory Committee	"	
St Louis, Cook and Lake Counties	"	
Minnesota Department of Natural Resources	"	